Stonehaven case analysis

Stonehaven, Inc. Case Analysis March 19, 2013 Part A

For this part of the analysis, consider each department in the Gdansk factory in isolation. Assume that the rest of the production system has no impact on the department you are considering. Assume that material handling times are negligible and ignore variability in processing times.

For the typical 100-pair batch, what is the daily capacity and manufacturing lead time within each of the following departments?

Cutting 8 hrs/day x 60 min/hr = 480 min/day Machine 1 = (0. 05 x 4)(100) + (5. 25 x 4) = 41 min/batch Machine 2 = (0. 5 x 4)(100) + (5. 00 x 4) = 40 min/batch Machine 3 = (0. 04 x 4)(100) + (4. 00 x 4) = 32 min/batch Manufacturing Lead Time (MLT) = Since the machines work simultaneously, the MLT is 41 min/batch. Capacity = 480 min/day ? 41 min/batch = 11. 7 batches/day x 100 pairs/batch = 1170 pairs/day

Stitching 8 hrs/day x 60 min/hr = 480 min/day Group 1 = (100/4) x 5. 0 = 125 min/batch Group 2 = (100/3) x 3. 0 = 100 min/batch Group 3 = (100/2) x 2. 5 = 125 min/batch Manufacturing Lead Time (MLT) = Because the components can’t move to the next group until the previous group is finished, the MLT is 5. min + 3. 0 min + 125 min = 133 min/batch. Capacity = 480 min/day ? 125 min/batch = 3. 84 batches/day x 100 pairs/batch = 384 pairs/day c. Lasting 8 hrs/day x 60 min/hr = 480 min/day Station 1 = 100 x 0. 7 = 70 min/batch Station 2 = 100 x 0. 6 = 60 min/batch Station 3 = 100 x 1. 0 = 100 min/batch Station 4 = 100 x 0. 9 = 90 min/batch Station 5 = 100 x 0. 3 = 30 min/batch Manufacturing Lead Time (MLT) = Because the components can’t move to the next group until the previous group is finished, the MLT is 0. 7 min + 0. 6 min + 1. 0 min + 0. min + 30 min = 33. 2 min/batch. Capacity = 480 min/day ? 100 min/batch = 4. 8 batches/day x 100 pairs/batch = 480 pairs/day Assumptions: My calculations are based on the assumption that the stamp time in the cutting process is per component. Therefore, the time given is the time it takes to stamp 1 of the 4 components on one machine. Another assumption I have made is the workers performing the stitching are all equally paced. It takes each worker the exact same amount of time to perform their duties and pass the product along to the next group.

If the batch size were reduced to 10 pairs, what would be the daily capacity and MLT within each of the following departments?

- Cutting;
- Stitching;
- Lasting
- Cutting

8 hrs/day x 60 min/hr = 480 min/day Machine 1 = (0. 05 x 4)(10) + (5. 25 x 4) = 23 min/batch Machine 2 = (0. 05 x 4)(10) + (5. 00 x 4) = 22 min/batch Machine 3 = (0. 04 x 4)(10) + (4. 00 x 4) = 17. 6 min/batch Manufacturing Lead Time (MLT) = Since the machines work simultaneously, the MLT is 23 min/batch. Capacity = 480 min/day ? 23 min/batch = 20. 9 batches/day x 10 pairs/batch = 209 pairs/day . Stitching 8 hrs/day x 60 min/hr = 480 min/day Group 1 = (10/4) x 5. 0 = 12. 5 min/batch Group 2 = (10/3) x 3. 0 = 10. 0 min/batch Group 3 = (10/2) x 2. 5 = 12. 5 min/batch Manufacturing Lead Time (MLT) = Because the components can’t move to the next group until the previous group is finished, the MLT is 5. 0 min + 3. 0 min + 12. 5 min =

20. 5 min/batch. Capacity = 480 min/day ? 12. 5 min/batch = 38. 4 batches/day x 10 pairs/batch = 384 pairs/day f. Lasting 8 hrs/day x 60 min/hr = 480 min/day Station 1 = 10 x 0. 7 = 7 min/batch Station 2 = 10 x 0. 6 = 6 min/batch

Station 3 = 10 x 1. 0 = 10 min/batch Station 4 = 10 x 0. 9 = 9 min/batch Station 5 = 10 x 0. 3 = 3 min/batch Manufacturing Lead Time (MLT) = Because the components can't move to the next group until the previous group is finished, the MLT is 0. 7 min + 0. 6 min + 1. 0 min + 0. 9 min + 3 min = 6. 2 min/batch. Capacity = 480 min/day ? 10 min/batch = 48 batches/day x 10 pairs/batch = 480 pairs/day Assumptions: (Same as question 1 because all we changed was the batch quantity.) My calculations are based on the assumption that the stamp time in the cutting process is per component.

Therefore, the time given is the time it takes to stamp 1 of the 4 components on one machine. Another assumption I have made is the workers performing the stitching are all equally paced. It takes each worker the exact same amount of time to perform their duties and pass the product along to the next group. Part B Now consider the factory as a system, and take into account interactions between the departments. Assuming production is done in 100-pair batches, what is the factory's daily capacity? Cutting 41 min/batch Stitching 133 min/batch

Lasting 33. 2 min/batch Capacity of the Factory = 480 min/day ? 133 min/batch = 3. 6 batches/day 4. What is the total MLT for a 100-pair batch? MLT Cutting= 41 min/batch Kitting= 10 min/batch Stitching= 133 min/batch

Steaming= 6 hrs x 60 min = 360 min/batch Lasting= 33. 2 min/batch TOTAL MLT= 577. 2 min/batch

Part C

How would you go about deciding the appropriate batch size for the Stonehaven factory? What factors would you consider? How do they interrelate? (You may wish to do some calculations, but concentrate on thinking conceptually. Focus only on your highest priorities for improving the production process at Stonehaven's Gdansk factory (be specific). Explain why they are important. What actions do you recommend? How would you implement your recommendations? What do you predict will be the consequences? The most important factor a production manager must consider when determining the appropriate production level of a good is the efficiency of the process. A manager must determine what level of production utilizes the available resources to the fullest extent possible.

Each step of a process will always be restrained by the other steps of the process as well as the available raw materials. As a production manager for Stonehaven, I would first analyze the individual steps of the process to make each individual step as efficient as possible. Then, I would look to see how each step affects the others. It looks as though the stitching and lasting processes produce the same amount of shoes regardless of the size of the batch. Due to this fact, it seems as though the cutting process is where management should be focusing on and working towards bringing this step in line with the others.

The cutting process can produce significantly more product than what the other two processes can handle. This makes me believe that we could utilize just two of the three machines. One could be devoted directly to the left shoe cuts and the other to the right shoe cuts. This would not only help with down time but also cut the expense of running a third machine. The third machine could be sold or kept on hand as a backup. There currently is no back up. If one of the machines fails, the entire process is held up and zero shoes are being produced.

This would create a shortage of shoes on the shelf for customers to buy and increase the likelihood that the customer will buy from someone else. If there was a back up machine, there may be a small delay in the process but significantly shorter period of time while the backup is getting up and running. The stitching process could be improved upon as well. It seems as though we could add another employee to Group 1 and decrease the amount of time it takes to process each batch to the same amount of time it takes Group 2 to process a batch.

This would effectively eliminate the down time Group 2 currently experiences when waiting for product from Group 1. Another employee could be added to Group 3 to produce the same results. This would effectively decrease the amount of time the entire batch gets moved onto the next step in the process. The only aspect of the lasting process that I see could be improved upon is the distribution of duties. Significant wait time could be eliminated at this stage in the process if one employee took on more duties that would even out the amount of time at each station.

Or, additional employees could be used to separate the duties the employees are currently performing. Either way, each station would be waiting less time to receive the product and thereby possibly increasing the amount of production for the entire facility. Now that we have analyzed each step individually, we must now look at the entire process as a whole. Stitching is the step of the process that takes the most amount of time to perform. The key is to find the best batch size that complements the other processes inrespectto this step.

The smaller the batch in the stitching process, the quicker the product is passed through the process to the next step. The manager must determine the appropriate batch size so that there is minimal wait time between the stitching and lasting processes. Some other ways to improve this process is to configure it in such a way that the process runs smoothly without significant wait times. There isn’t really anything the employees in the other stations could be doing to create value to the process while they are waiting on more products to produce.

So, the most important goal of the manager is to figure out a way for the entire process to run fluidly. Once this is achieved, inventory between the stations would be decreased to zero. The process would be so perfectly timed that the product would arrive at its destination at the exact time it is needed. This is the ideal goal of a production manager. The fewer inventories being held, the less cash is being held up on the shelf and the more is being sent out the door. The most important aspect of this process to the production manager is making sure the process is configured in the most efficient way.

This specific process should be altered to bring the cutting process in line with the rest of the steps. However, if the manager had the funds to significantly increase employees in the stitching and lasting areas, these could be brought back in line with the cutting and Stonehaven could produce significantly more shoes than they are currently producing. However, the issue at hand in this scenario is the amount of funds that this will require. The best way to increase revenue is by removing one of the cutting machines, increasing a couple employees in the stitching department and realigning the duties in the lasting department.